

Please amend Claim 16 as follows:

16. (Amended) A catheter for insertion through a patient's vascular system, comprising:

- as
- a) a tube having a predetermined outside diameter and a distal end;
 - b) a bolus including a connector section, a passage section and a nose section, said connector section being connected to said distal end on a longitudinal axis of said tube and connector section;
 - c) said passage section containing an axially extending passage and a radially extending port which opens through the side of said bolus behind said nose section;
 - d) said nose section being joined to said passage section at the forward end of said passage section and having a bullet nose, the maximum, cross-sectional diameter of said nose section where it joins said passage section being substantially less than said predetermined diameter;
 - e) said nose section having an axis which is inclined from said longitudinal axis so that said nose section has an external surface portion which is substantially tangent to an imaginary cylinder containing the trailing edge of said port.

Please add new Claim 17 as follows:

- ac
17. (New) The catheter of Claim 16 further characterized in that:
- a) said maximum cross-sectional dimensions of said nose section where it joins said passage section being at least 25 percent smaller than the largest cross-sectional dimensions of said passage section.

REMARKS

The Examiner's analysis of the claims and comments have been carefully considered. The specification has been amended to redescribe the structure shown in FIGURE 1 and FIGURE 2. Drawing corrections have been proposed. No new matter has been added, as will be readily apparent.

Claim 6 has been canceled. Claims 1-4, 7-12, 14 and 16 have been amended. New Claim 17 has been added.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current Amendment. The attached page is captioned "Version With Markings to Show Changes Made."

Original claims 1-16 were rejected under 36 U.S.C. § 102 over each of the Conway et al., Cruz et al. and Mahurkar references. Applicant submits that no one or more of these references anticipates the structure described in the original claims. The claims have been amended (and supplemented) merely to refocus distinguishing language and obviate 35 U.S.C. § 112 objections.

The Conway et al. reference discloses a "Foley" catheter, not a blood vessel catheter. It is unrelated to, and unsuited for, vascular insertion.

In addition, Conway et al. discloses catheters wherein the nose section is not offset from the axis of the catheter section containing the lumen or lumens, contrary to the Examiner's suggestion. Such a construction would, in fact, be harmful to the use and purpose of a Foley catheter. It is the lumen which is offset from the center axis of the Conway et al. catheter not the nose section.

The Cruz et al. reference is no more pertinent than Conway et al. Its bullet nose in front of the catheter's passage section is neither offset to one side of the catheter bolus axis nor inclined to that axis. It follows that nowhere is its outermost extremity substantially tangent to an imaginary cylinder containing the outermost periphery of the passage section.

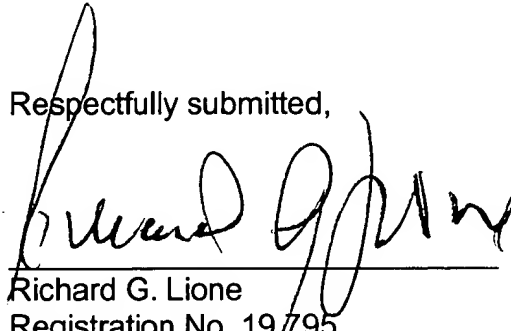
The Mahurkar reference discloses a blood vessel catheter with a bolus which does remotely resemble that defined by the claims at issue. The one catheter (FIG. 3) which Mahurkar shows with an unperforated nose does not have that nose offset to one side of the axis of the passage section; however. It is, in fact centered on that axis. It is not the relationship of bullet nose and lumen axis which is important in applicant's invention, it is the relationship of the nose to the axis of the bolus passage section.

The fact that applicant's invention is an entirely different animal than the Conway et al. catheter, the Cruz et al. catheter and the Mahurkar catheter is readily

apparent, it is respectfully submitted. Defining the differences in the claims is, of course, what is necessary. It is believed that the claims now clearly do that.

The application should now be in condition for allowance. Passage to issue is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Richard G. Lione", written over a horizontal line.

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification

Paragraph beginning at line 24 of pages 3 and 4 has been amended as follows:

The passage section forward of the mid-point of the port, and the nose section, are effectively inclined toward the longitudinal axis of the bolus and the tube. The passage section ~~meets~~joins the nose section of the bolus at the forwardmost end of the side port on a transverse plane where the nose section is at a maximum thickness in a direction passing through the bolus axis and the center of the port. The plane is inclined rearwardly toward the port at an angle corresponding to the effective angle of incline of the curving passage section toward the bolus axis. The thickness of the nose section in this plane in the direction of the bolus axis and the port is 25% to 30% less than the outside diameter of the catheter tube.

Paragraph beginning at line 6 of page 7 has been amended as follows:

The nose section 57 has a slightly elliptical shape in cross-section on the plane P where it ~~meets~~joins the passage section 56, as seen in FIGURE 5. The aforementioned configuration produces a maximum thickness of the nose section 57, in the direction of the port 69 and in the plane P which is 29% smaller than the outside diameter of the catheter tube 11. At the same time, as seen in FIGURES 1 and 2, the outermost periphery of the nose section 57 is, at 90, tangent to an imaginary cylinder defined by the outer surface of the tube 11 and the bolus passage section 56, the cylinder being seen in end view in FIGURE 2.

In the Claims

Claim 6 has been canceled.

Claim 1 has been amended as follows:

1. (Amended) A blood vessel-catheter for insertion through a patient's vascular system, comprising:

- a) a catheter tube and a bolus molded of resilient plastic;
- b) said catheter tube including a body having a cylindrical wall through which a lumen extends to a distal end of the tube;
- c) said bolus including a body having a connector section joined to said catheter tube at said distal end, a passage section and a nose section;
- d) said nose section having an unperforated, rounded bullet-nose on it;
- e) said passage section of said bolus containing an axially extending passage communicating at one end with said tube lumen and at another end with a port opening radially through the side of said bolus body;
- f) said nose section being joined to said passage section at the forward end of said passage section and, where it joins said passage section, being off-set to one side of the longitudinal axis of said passage section and having a maximum thickness which is smaller than the outside diameter of the tube.

Claim 2 has been amended as follows:

2. (Amended) The ~~blood vessel-catheter~~ of Claim 1 further characterized in that:

- a) said nose section, where it joins said passage section, has a center which is radially offset from the longitudinal axis of said ~~bolus~~ passage section so that [whereby] a portion of the outer periphery of said nose section is [normally] substantially tangent with an imaginary cylinder containing the outer periphery of said passage section ~~where said port opens~~.

Claim 3 has been amended as follows:

3. (Amended) The ~~blood vessel~~-catheter of Claim 1 further characterized in that:

a) said port extends around more than 180° of the circumference of said passage section.

Claim 4 has been amended as follows:

4. (Amended) The ~~blood vessel~~-catheter of Claim 1 further characterized in that:

a) said bolus body includes a longitudinally extending stiffening arch formed outwardly of said passage section opposite said port.

Claim 7 has been amended as follows:

7. (Amended) The ~~blood vessel~~-catheter of Claim 1 further characterized in that:

a) said port has a trailing edge at the outer periphery of said passage section; and
b) said trailing edge is segmentally circular in cross-section.

Claim 8 has been amended as follows:

8. (Amended) The ~~blood vessel~~-catheter of Claim 2 further characterized in that:

a) said bolus body has opposite sides bracketing said port which taper radially inwardly toward the longitudinal axis of said passage section as they extend forwardly from said passage section into said nose section.

Claim 9 has been amended as follows:

9. (Amended) The ~~blood vessel~~ catheter of Claim 8 further characterized in that:

- a) said port has a trailing edge at the outer periphery of said passage section;
- b) said radially inward taper of said sides beginning forwardly of said trailing edge.

Claim 10 has been amended as follows:

10. (Amended) The ~~blood vessel~~ catheter of Claim 1 further characterized in that:

- a) said tube contains a single lumen and said passage section contains a single passage.

Claim 11 has been amended as follows:

11. (Amended) A bolus for a blood vessel catheter, comprising:

- a) a generally cylindrical body ~~having a longitudinal axis and including~~ a passage section having a longitudinal axis and a nose section joined to said passage section;
- b) said passage section containing a port opening radially outwardly through said body, transversely of said axis;
- c) said passage section having a portion centered on said longitudinal axis and another portion which is, with said nose section, inclined to said longitudinal axis in the same radial direction as said port so that whereby the center of said nose section is offset to one side of said longitudinal axis.

12. The bolus of Claim 11 further characterized in that:

- a) said nose section has an unperforated, bullet nose thereon; and

b) said nose section has an outermost extremity which, in one location, is ~~normally~~ substantially tangent to an imaginary cylinder containing the outermost periphery of said passage section.

14. The bolus of Claim 13 further characterized in that:

a) said nose section has an unperforated, bullet nose thereon; and
b) said nose section has an outermost extremity which, in one location, is ~~normally~~ substantially tangent to an imaginary cylinder containing the outermost periphery of said passage section.

Claim 16 has been amended as follows:

16. (Amended) A ~~blood vessel catheter~~ for insertion through a patient's vascular system, comprising:

a) a tube having a predetermined outside diameter and a distal end;
b) a bolus including a connector section, a passage section and a nose section, said connector section being connected to said distal end on a longitudinal axis of said tube and ~~bolus~~ connector section;
c) said passage section containing an axially extending passage and a radially extending port which opens through the side of said bolus behind said nose section;
d) said nose section being joined to said passage section at the forward end of said passage section and having a bullet nose ~~and a,~~ the maximum, cross-sectional diameter of said nose section where it joins said passage section being ~~which is~~ substantially less than said predetermined diameter;
e) said nose section having an axis which is ~~offset~~ inclined from said longitudinal axis ~~whereby so that~~ said nose section has an external surface portion which is substantially tangent to an imaginary cylinder containing the trailing edge of said port.

Claim 17 has been added as follows:

17. (New) The catheter of Claim 16 further characterized in that:

a) said maximum cross-sectional dimensions of said nose section where it joins said passage section being at least 25 percent smaller than the largest cross-sectional dimensions of said passage section.